DOCUMENT RESUME

ED 138 289 IR 004 718

AUTHOR Pelczarski, Mark W.
TITLE Documentation of CAISP (Computer Assisted Individualized Study Package). Illinois Series on Educational Applications of Computers. Number 12.
REPORT NO ISEAC-12
PUB DATE Dec 76
NOTE 41p.; For related document, see IR 004 717 ; Charts and appendix A may be marginally legible due to small print of original document

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS Computer Assisted Instruction; *Computer Programs; Flow Charts; *Individualized Instruction; *Programing; Secondary School Teachers
IDENTIFIERS *BASIC

ABSTRACT

Computer Assisted Individualized Study Package (CAISP) is a set of computer programs in BASIC intended to help teachers administer individualized study courses (IR 004 717). This report describes the four computer programs which, with their data files, make up CAISP. Flowcharts are provided for each program and future modifications to CAISP are discussed. Sample listings for each program are provided. (DAG)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED138229

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Number 12

The Illinois Series on

Educational Applications of Computers

Documentation of CAISP

(Computer Assisted Individualized Study Package)

Mark W. Pelczarski

PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL HAS BEEN GRANTED BY
Bruce Hicks

December 1976

Department of Secondary Education

College of Education

University of Illinois

Urbana, Illinois

BEST COPY AVAILABLE

© Bruce Hicks (1976)

IR 004 718

TABLE OF CONTENTS

		Page
I.	Overview - The Four Programs	1
II.	Overview - The Data Files	1
III.	Detail - The Data Files	2
	3.1 CAISPU	2
	3.2 CAISPS	2
	3.3 The Course File	2
	3.4 The Unit File	4
IV.	Detail - The Programs	7
	4.1 CAISPT - The Teacher/Unit Program	7
	4.2 CAISP - The Student Program	9
	4.3 CAISPR - The Records Program	11
	4.4 CAISPD - The Director's Program	13
V.	Future Modifications to CAISP	15

Appendix A - Listings — Appendix

CAISPT 1
CAISP 3
CAISPR 5
CAISPD 8

Appendix B - Variable Definitions 9

Documentation of CAISP

Mark W. Pelczarski

I. Overview - The Four Programs

The four programs that make up CAISP are:

CAISPT - the teacher/unit program	384 lines, 17 blocks *
CAISP - the student program	295 lines, 12 blocks
CAISPR - the records program	331 lines, 14 blocks
CAISPD - the director's program	129 lines, 6 blocks

CAISPT allows teachers to write, edit, and print units. CAISP (the program) allows students to use the units (which can be thought of as high level language computer programs) on an interactive terminal. CAISPR allows the teacher to check student's course records, do some manipulation of student records and print unit summaries. CAISPD is for a person specified as the "director," whose task it is to set up new course and unit names.

II. Overview - The Data Files

CAISP needs the following data files:

CAISPU - contains course names, teacher passwords, and unit names for each course.

CAISPS - a scratch file.

A data file for each course. The sample course discussed in this report is METRIC, and there is a data file by that name. The file holds student names, student passwords, units entered, and individual records.

A data file for each unit. One sample unit is ARITH, and there is a data file by that name. The file holds the unit instructions which were put in through the teacher/unit program.

---

* A "block" is 128 36 bit words on the DEC 10.

The minimum number of data files necessary to run anything on CAISP is therefore four. The number of data files existing will be (number of courses) + (number of units) + 2. All files are sequential access files, and only string variables are stored in them.

III. Detail - The Data Files

The following explanations are only to provide understanding of how the files are used. All manipulations are done by the programs.

3.1 CAISPU

CAISPU is the file that is checked for the validity of a course name, for the validity of a teacher's password in CAISPT and CAISPR, and for whether a unit chosen is listed with the course chosen.

The string "*N" is used as a delimiter between different courses in CAISPU. Here is an example of how CAISPU looks (the strings are separated only by blanks):

```
*N METRIC CONVERT INTR ARITH LENGTH VOLUME
WEIGHT TEMPER MSAMP *N MENDEL OWL
GENE1 GENE2 GENE3 GENE4
```

In the example, METRIC and MENDEL are the two courses, with teacher passwords CONVERT and OWL, respectively. INTR, ARITH, LENGTH, VOLUME, WEIGHT, TEMPER, and MSAMP are the units in the METRIC course. GENE1, GENE2, GENE3, and GENE4 are units in the MENDEL course. A unit may appear under more than one course.

3.2 CAISPS

CAISPS is a scratch file used during execution of the CAISP programs. The file is empty at the beginning of program execution, and is scratched when the programs complete execution.

3.3 The Course File

The course file contains all student records for a course. It uses "*N" as a delimiter between students. This is how METRIC (the data file) might look:

```
*N ANN A INTR 1429 1493 0 ARITH 7149
245 16 *N BILL B INTR 1365 1365 0 *N
CATHY C INTR 2730 4095 48 ARITH -1 0 0
*N
```

CAISP and CAISPR decode this file for record usage. The user does not need to understand the coding. In this example, there are three students in the course: ANN, BILL, and CATHY. Their passwords are A, B, and C, respectively. Ann has used units INTR and ARITH. Bill has used INTR, and CATHY has used INTR and may have used ARITH (explained later).

The numbers (which, by the way, have to be stored as string representations on the DEC 10) hold the student's records for each unit. The first of three numbers after each unit name holds all data on which questions in that unit have been answered correctly. The second number contains data concerning which questions the student has been given. The third number tells which questions the student has taken more than once.

This information is stored using bit patterns. A bit is the smallest storage cell in a computer; it is capable of being in one of only two positions, usually denoted '0' and '1'. In binary arithmetic, these are the two Binary digITs, hence the word BIT.

Bits make up "words" on a computer, but the number of bits per word varies with the machine. The DEC 10 has 36 bit words. These words can represent numbers in binary as follows (the example will use a 4 bit word):

2^3	2^2	2^1	2^0
1	1	0	1

Notice the powers of two represented by each bit. In our normal counting system, base 10, we look at numbers as follows:

10^2	10^1	10^0
3	5	7

This number is $7 \times 10^0 + 5 \times 10^1 + 3 \times 10^2 = 7 + 50 + 300 = 357$. Using the same pattern, the binary number in the 4 bit word above is $1 \times 2^0 + 0 \times 2^1 + 1 \times 2^2 + 1 \times 2^3 = 1 + 0 + 4 + 8 = 13$.

It is in this manner that the numbers in the course file are determined. If the 24 question maximum is used, 24 bits are needed for each piece of data stored for the questions: whether the question has been correct, whether it has been taken, and whether it has been taken more than once. Hence, three 24-bit numbers are used for each unit's records for each student.

The following example shows how the first number, which tells which questions have been correct, is derived (this example shows only 12 of the 24 bits; 12 of the 24 questions):

Question number	12	11	10	9	8	7	6	5	4	3	2	1
12 bit word	1	0	0	1	0	1	0	1	1	0	0	1
Binary value	2^{11}	2^{10}	2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
	2048	1024	512	256	128	64	32	16	8	4	2	1

Questions 1, 4, 5, 7, 9, and 12 were correct. The first number shown after the unit name will be 1 + 8 + 16 + 64 + 256 + 2048 = 2393.

Going in the other direction, we can find out which questions ANN got correct in the unit INTR (in the sample data file METRIC) by representing 1429 in binary:

$$1429 = 1024 + 256 + 128 + 16 + 4 + 1$$
$$= 2^{10} + 2^8 + 2^7 + 2^4 + 2^2 + 2^0$$

or 1 0 1 1 0 0 1 0 1 0 1 binary

Counting from right to left, she correctly answered questions 1, 3, 5, 8, 9, and 11.

In the same way, the second number after the unit name tells which questions the student has seen, and the third number tells which questions have been taken more than once.

The first number is set to -1 if the unit is to be a No Record Unit for that student. In the example, CATHY has ARITH as a No Record Unit. When this option is set, the unit is added to the student's list if it does not already appear there. It is therefore possible that CATHY has not yet used ARITH.

3.4 The Unit File

The unit file contains the unit instructions, as they were input through the teacher/unit program. The student program reads these instructions from the unit file and then acts upon them accordingly.

Each type of segment input through the teacher/unit program is given a code and stored in the unit file, along with any text or label names. Following is the list of segment codes:

*T designates a text segment. It is followed by all the text belonging to the segment. The CAISP program will print all text until it comes to a line beginning with an asterisk, (meaning the next instruction).

*Q designates a question. It is followed by the text of the question, then the answer segment.

*A designates an answer segment. It is followed by the acceptable answers. The end of the list of answers is the next instruction.

*R designates a replacement question. In all other respects it is like a question.

*MR designates a right answer message. It is followed by the text of the message.

*MW designates a wrong answer message. It is also followed by the message text.

*L designates a label. It is followed by the label name.

*BN says to branch if a certain number of questions already taken is correct. It is followed by the minimum number correct and the name of the label to which to branch.

*BC says to branch if a certain question has been correctly answered. It is followed by two label names; one for the question to check, and one to which to branch.

*BT says to branch if a certain question has been taken. The same two label names as *BC follow.

*BL designates an unconditional branch. It is followed by the label name to which to branch.

*CU designates a chain to another unit. It is followed by the unit name.

*CP designates a chain to a BASIC program. This is followed by the program's name.

*E designates the physical end of the unit.

Following is a listing of the data file containing the sample unit in ISEAC Number 11, Appendix A:

```
*T "YOU HAVE JUST BEGUN A SERIES OF LESSONS CONCERNING THE METRIC"
"SYSTEM.  ALTHOUGH THE METRIC SYSTEM MAY SEEM DIFFICULT AT  FIRST"
"BECAUSE IT IS UNFAMILIAR IT IS ACTUALLY SIMPLER TO USE THAN OUR"
```

```
"PRESENT SYSTEM.  WITHIN THE NEXT FEW YEARS THE UNITED STATES"
"WILL BE ADOPTING THE METRIC SYSTEM TO REPLACE OUR UNITS OF"
"MEASUREMENT KNOWN AS THE ENGLISH SYSTEM; AND DURING THE"
"PERIOD OF CHANGEOVER AMERICANS WILL HAVE TO BE FAMILIAR"
"WITH BOTH SYSTEMS.  IT IS THE GOAL OF THESE LESSONS TO HELP"
"YOU DO SO."  *T
"ONCE YOU ARE FAMILIAR WITH THE METRIC SYSTEM IT SHOULD BE"
"POSSIBLE FOR YOU TO MAKE GOOD ESTIMATES AND/OR CONVERSIONS WITH"
"THE ENGLISH SYSTEM.  TO BE ACCURATE HOWEVER IT WILL BE NECESSARY"
"TO KNOW SOME OF THE CONVERSION FACTORS AND TO BE ABLE TO DO SOME"
"SIMPLE ARITHMETIC.  THE FOLLOWING IS A SHORT ARITHMETIC QUIZ TO"
"TEST YOURSELF BEFORE YOU GO ON.  YOU MAY WANT TO USE PAPER AND"
"PENCIL OR EVEN A CALCULATOR IF AVAILABLE. (SORRY YOU CANNOT DO"
"CALCULATIONS ON THIS COMPUTER TERMINAL.)"*T
"TO PASS THIS QUIZ YOU WILL HAVE TO GET AT LEAST 3 OF THE 4"
"PROBLEMS CORRECT." *Q "I    9.6" "I  +82.0" "I  ----" *A 91.6
*MR RIGHT. *MW "NO -- THE ANSWER IS 91.6" *R "I  54" "I  -32"
"I   --" *A 22 22. 22.0 *MR RIGHT. *MW
"NO -- THE ANSWER IS 22. YOU NEED TO WORK ON YOUR ADDITION AND"
"SUBTRACTION." *Q "I  84" "I   -26" "  ---" *A 58 58. 58.0 *MR
GOOD *MW "NO -- THE ANSWER IS 58." *R "I   43.2" "I  -16.9" "I   ----"
*A 26.3 *MR GOOD. *MW
"NO -- THE ANSWER IS 26.3. WORK ON YOUR SUBTRACTION!" *Q "I   21"
"I X 5" "I  --" *A 105 105. 105.0 *MR RIGHT. *MW
"NO...THE ANSWER IS 105." *R "I   30.1" "I  X11.2" "I  ----" *A
337.12 *MR RIGHT. *MW
"NO. THE ANSWER SHOULD BE 337.12 -- PRACTICE MULTIPLICATION." *Q
"I     --" "I  14/56" *A 4 4. 4.0 *MR OKAY! *MW
"NOPE. YOU SHOULD HAVE GOTTEN 4." *R "I       ------" "I  11.3/144.64"
*A 12.8 *MR OKAY! *MW
"NOPE...THE ANSWER IS 12.8. WORK ON YOUR DIVISION." *BN 3 PASS *T
"YOU HAVE MISSED AT LEAST 2 OF THE PROBLEMS.  PLEASE CONTACT YOUR"
"INSTRUCTOR FOR A SET OF PRACTICE ARITHMETIC PROBLEMS AND"
"AFTER YOU HAVE FINISHED WORKING ON THEM COME BACK AND TRY THIS"
"QUIZ AGAIN." *BL END *L PASS *T
"GOOD. YOU HAVE GOTTEN AT LEAST 3 OF THE PROBLEMS"
"CORRECT AND ARE NOW READY TO GO ON TO THE NEXT UNIT --"
"AN INTRODUCTION TO THE METRIC SYSTEM -- TITLED INTR." *L END *E
```

IV. Detail - The Programs

4.1 CAISPT - The Teacher/Unit Program

CAISPT is the program that allows teachers to write, edit and print units. It uses the unit file, CAISPS, and CAISPU. On the following page is a flow chart of CAISPT's operations. The listing of CAISPT is in Appendix A.

Here are the subroutines used in CAISPT, preceded by the line numbers at which they begin and end:

40-460 Main Program - sign on, GOSUB to Edit (460), Exit.

470-660 Edit Unit - choices of Add, Alter, Delete, Print, and Exit. Routes user to other subroutines.

670-1630 Add Segment(s) - finds location using search (2500), segment choices, insertion of segments.

1640-1710 Text Input - inserts text in unit for TEXT, QUESTION, ANSWER, and MESSAGE segments.

1720-2370 Alter a Segment - finds location using search (2600), allows segment alterations. Will not allow deletion of certain lines (last remaining line, or branch segment).

2380-2590 Delete a Segment - finds location using search (2600), erases segment. When QUESTION is deleted, it also deletes ANSWER and RIGHT/WRONG ANSWER MESSAGE. Cannot delete ANSWER segment alone, or END segment.

2600-2800 Search - takes A (number of segment to find), returns A (zero if segment number out of bounds), Q (number of questions preceding A), and M (the code for the next segment instruction).

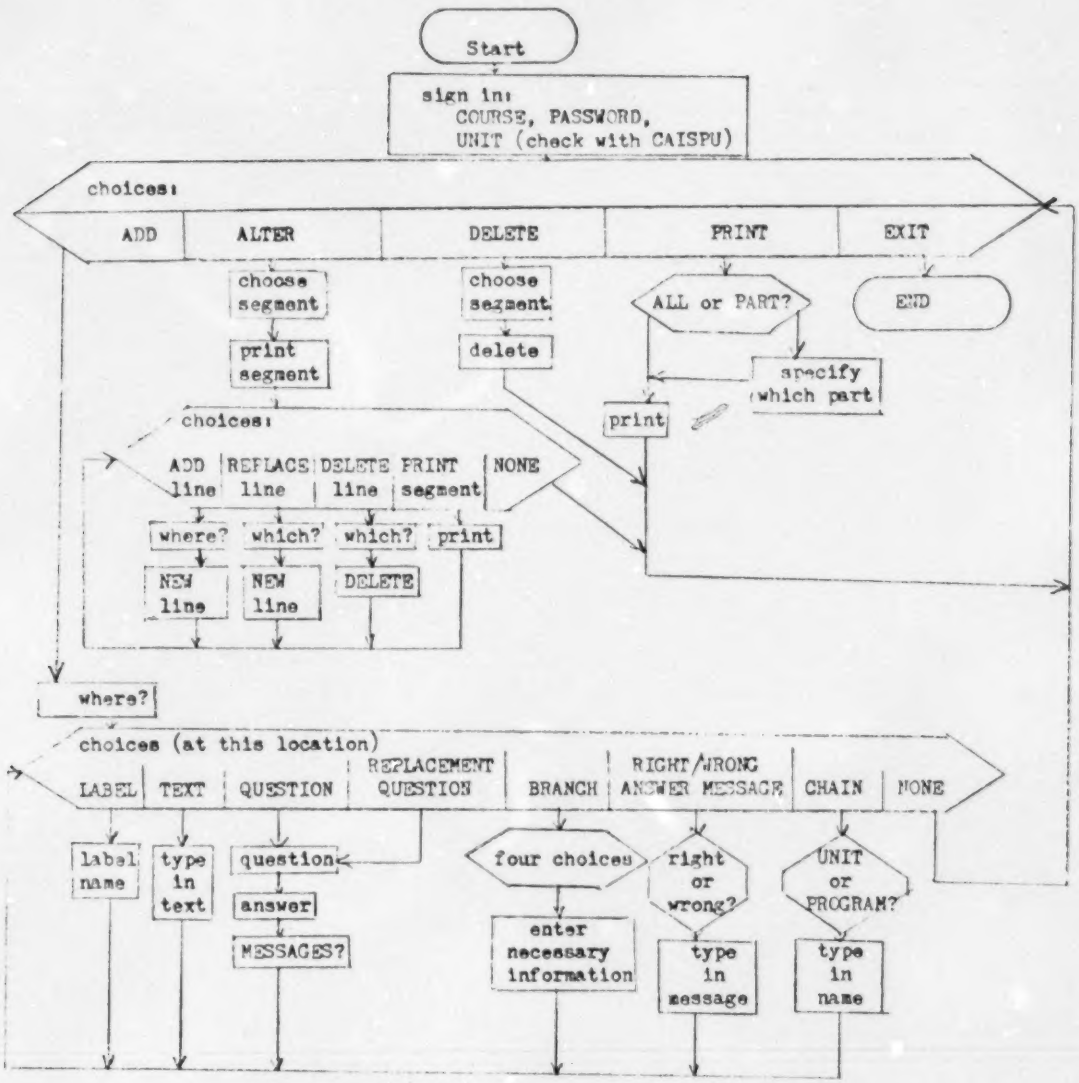
2810-2930 Finish reading File #1 (Unit) into File #2 (CAISPS), then copy #2 back into #1.

2940-3760 Print Unit - prints unit for teacher. Will print entire unit or part of unit.

3770-3830 Print to next * - prints text until next instruction is encountered.

The files used in CAISPT are, as with the other CAISP programs, sequential access files. Since data can only be read out sequentially, and since writing in the file has to be done by erasing the entire file first, editing is done with the

Flowchart of CAISPT



help of CAISPS, the scratch file. When a change is to be made in a file, the original file is copied into the scratch file up to the point of change. The change is then made on the scratch file, and the rest of the original file is copied to the scratch file. The original file is erased, and the updated scratch file is then copied in its entirety to the original file. This last part is done in the subroutine beginning at 2810.

The file numbering system in CAISPT is as follows:

#1 (lines 50-350) CAISPU

#1 (line 360-) unit

#2 CAISPS

Variable definitions for CAISPT are in Appendix B.

4.2 CAISP - The Student Program

The program CAISP allows a student to use a unit in a course in which he is enrolled. His name must be listed in the course file, and he must enter the course name, his password, and the unit name. The unit must be listed in CAISPU with the course. On the following page is a flowchart of CAISP's operations. The listing of CAISP is in Appendix A.

Here are the subroutines used in the CAISP program:

40-970 Main program - sign in, set variables, GOSUB 980 to execute unit, update files, exit.

980-1590 Execute Unit - decode variables, read instructions and send to proper subroutine; after execution, encode variables and return to main routine.

1600-1690 Echo file to * - prints contents of unit to next instruction.

1700-2240 Question sequence - administer appropriate question/replacement question, check answer, print right/wrong answer message if existent and appropriate, reset variables.

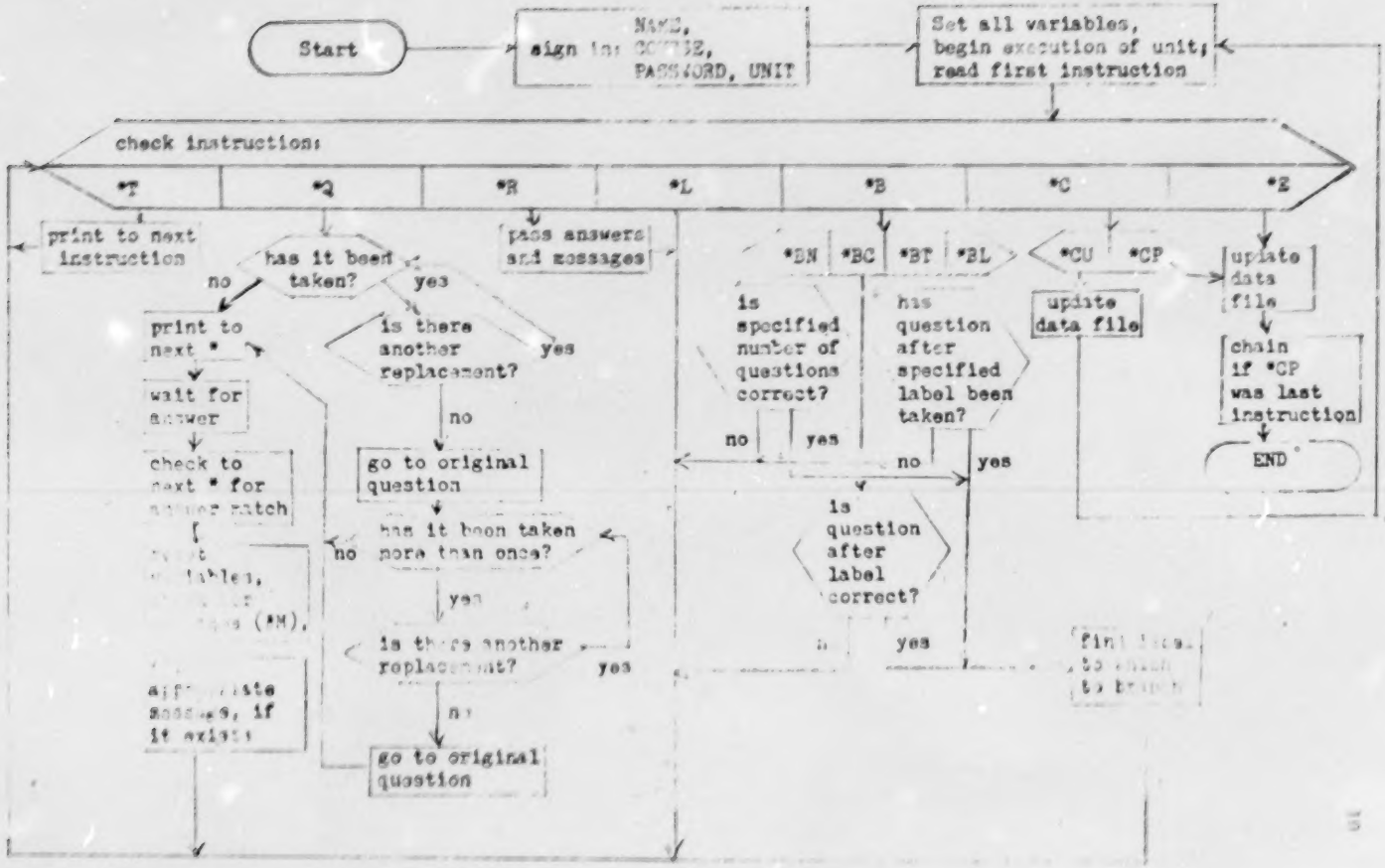
2250-2300 Read to next * - finds next instruction.

2310-2710 Conditions - check branch instructions, and if a branch is necessary, go to that part of the unit.

2720-2840 Search for label N$ - given label name N$, goes to that segment in the Unit.

2850-2940 Return to I1 - goes to the I1th segment of the unit.

Flowchart of CAISP



The files in CAISP are numbered as follows:

#1	(line 50 - line 480)	CAISPU
#1	(line 49 -)	Unit
#2		course
#3		CAISPS

Variable definitions for CAISP are in Appendix B.

4.3 CAISPR - The Records Program

CAISPR allows the teacher to look at students' records, delete certain records, set the no record option, see a unit's records and print unit summaries. The next page shows a flowchart of the program. The listing of CAISPR is in Appendix A.

Here are the CAISPR subroutines:

40-1310 Main Program - sign on, choices, execution of choices using subroutines, sign off.

1320-1410 List Student Names - prints sign on names of all students enrolled in course.

1420-1680 Find a student - locates a particular student's records in the course file. Student's name is asked for in the subroutine. N$ is the student's name. The variable I is returned as 1 if student is found, 0 if not found.

1690-1980 Print student N$ - prints student N$'s records, after they have been found in subroutine 1420 (prior to the use of the 1690 subroutine). Prints the name of each unit the student has used and the results for that unit.

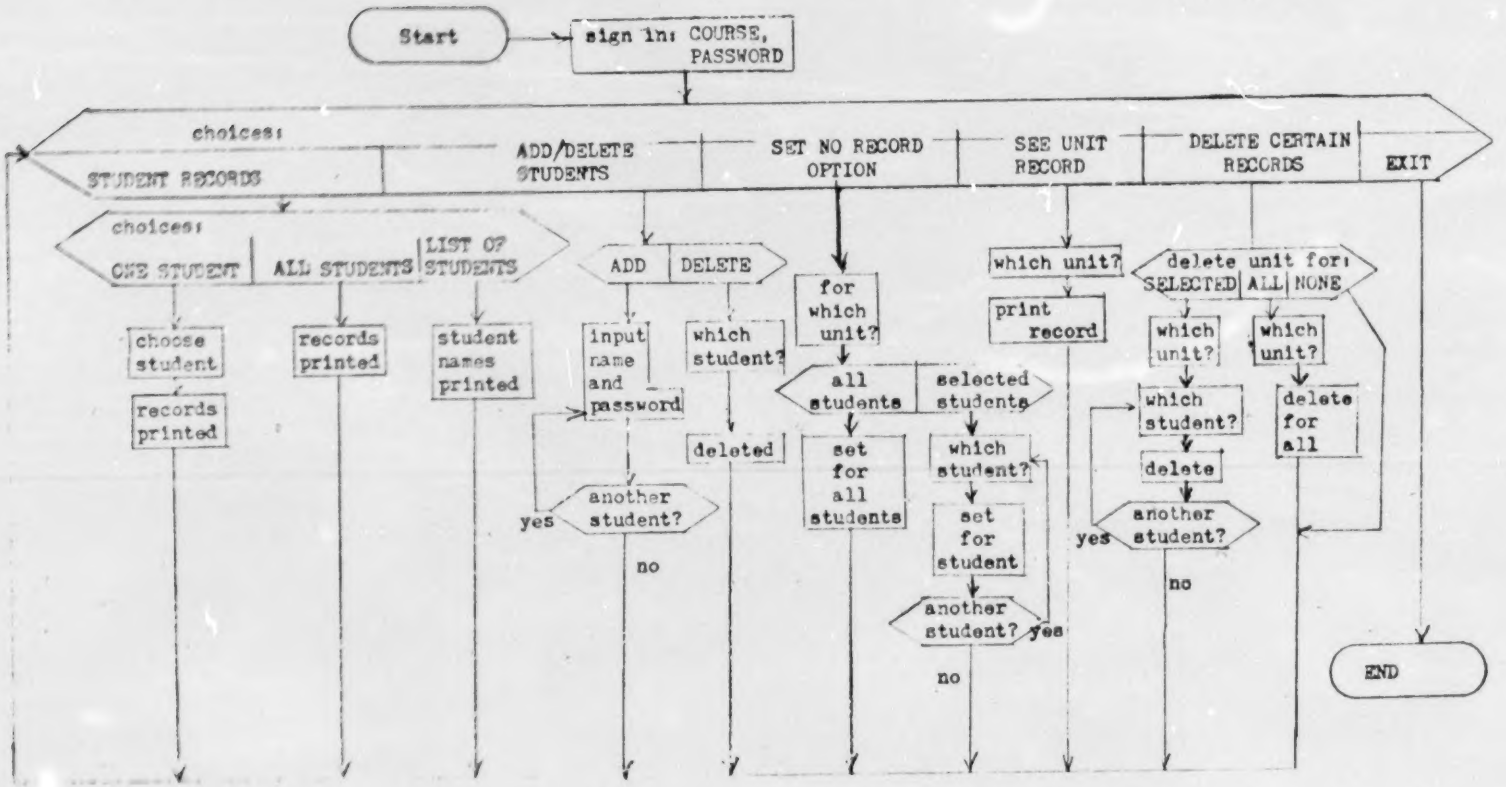
1990-2040 Delete a student - deletes student N$ and his records after they have been found by subroutine 1420 (prior to use of the 1990 subroutine). Also, uses subroutine 2230 to update records.

2050-2220 Add a student - allows addition of one or more students (with passwords) to course list.

2230-2350 Update - copies remainder of File #1 to File #3, scratches #1, then copies #3 to #1.

2360-2450 Delete Unit I$ from found student - a unit previously specified as I$ deleted from student N$ (found using subroutines 1420 prior to use of the 2360 subroutine).

Flowchart of CAISPR



2460-2670 Decompose A, B, C - takes A, B, and C, the three record variables for a student and a unit, and computes the record for the next question. (First time called, the first question, second time called, second question, etc.) A, B, and C are altered in this subroutine, but this has no effect on the stored records as the files are not changed. N$ is returned as the code for printing the record for that question.

2680-2770 Set No Record Unit I$ to Student N$ - if student N$ (previously found with subroutine 1420) has already used the unit I$, records are replaced with -1, 0, 0. The -1 as first number designates the No Record Unit. If the student has not yet used unit I$, it is added to that student's list with records -1, 0, 0.

2780-3280 See Unit Record - unit name is asked for in the subroutine, and that unit's question by question records are given, along with the number of students entered and the number of No Record Students.

Lines 40 and 50, READ L and DATA 24, allow the maximum number of questions to be varied easily by changing the DATA statement. This option is not yet in the CAISP program, but should be added.

The file numbering the CAISPR is as follows:

#1	(line 80 - line 240)	CAISPU
#1	(line 250 -)	course
#3		CAISPS

Variable definitions for CAISPR are in Appendix B.

4.4 CAISPD - The Director's Program

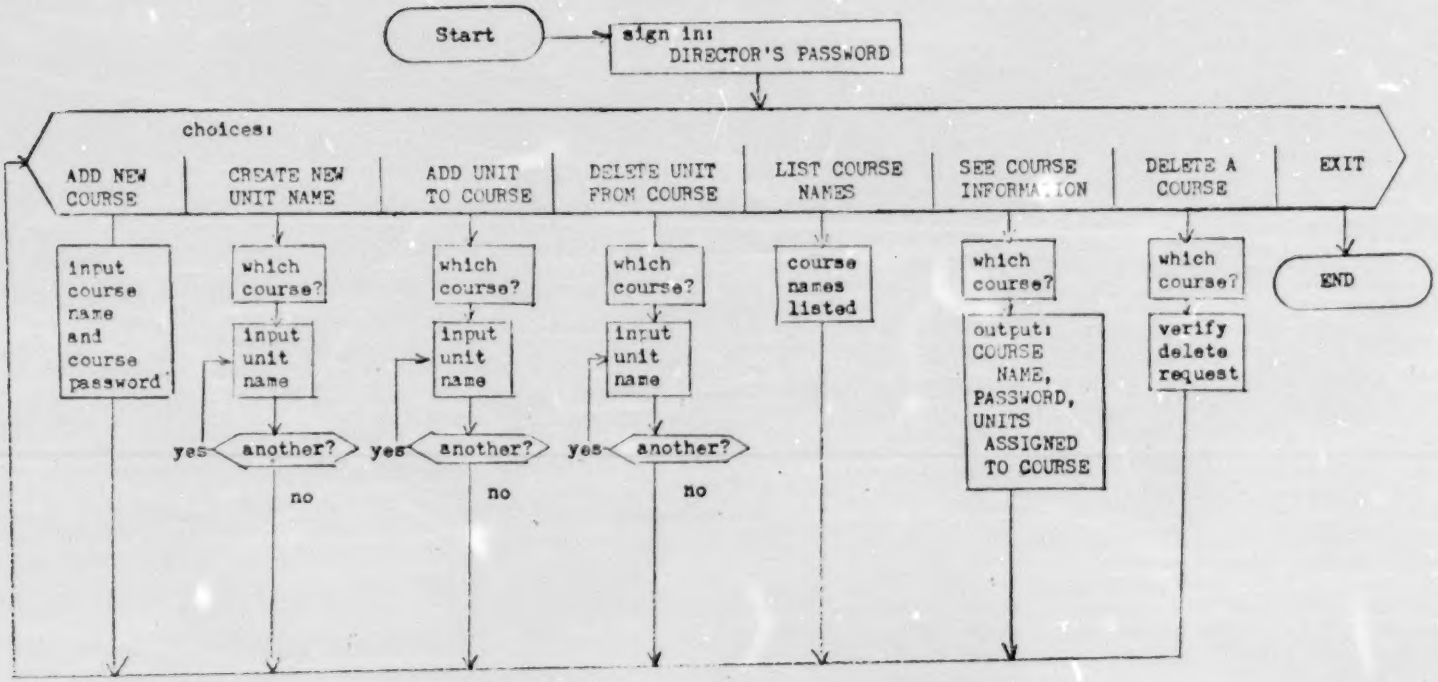
CAISPD allows the designated director of CAISP to add new courses, create new unit files for courses, add existing units to courses, delete units from courses, list the courses, see all information on a course, or delete a course. The next page gives a flowchart of CAISPD. The listing of CAISPD is in Appendix A.

CAISPD has its main program from line 40 to line 1040, with the following two subroutines:

1050-1150 Update files - copy remainder of File #1 to File #3, erase #1, copy #3 into #1.

1160-1280 Find course A$ - return S = 1 if found, S = 0 if not found.

Flowchart of CAISPD



The files are numbered as follows:

#1 CAISPU

#2 New course or new unit (file name created and data initialized).

#3 CAISPS

Variable definitions for CAISPD are in Appendix B.

V. Future Modifications to CAISP

CAISP was evaluated through use by teachers and graduate students in the College of Education at the University of Illinois. Some evaluations were done in conjunction with course work by the evaluators, others through interest in the project. Prior abilities varied from those with no computer background, to some with several years experience with computers in education. Through comments, suggestions, and difficulties experienced with initial use of CAISP, along with addition of features originally planned, CAISP has been refined during its six months of existence. Following is a combined list of suggestions made since this refinement, suggestions made prior to the refinement but not included due to priorities, and original plans that have not yet been put into the programs:

1. Besides allowing RIGHT/WRONG ANSWER MESSAGES with questions (which replaced the text segments and branching that were necessary with the first version of CAISP), allow right and wrong answer branching to be inserted with a question. This would involve creation of two new segment types and changes in CAISPT and CAISP.

2. In the CAISPT program, allow an option that will give the number of the END segment upon request.

3. In CAISPT, have an "experienced user option" that will print fewer instructions and allow input of segments by letter code rather than by picking one of a list of choices. This would let teachers write units more quickly after they have learned to use CAISP.

4. Have a separate diagnostic program that will check a unit for errors (missing label, too many right/wrong messages, etc.) before the unit is used by the student program.

5. Have the student program make an initial pass through the unit and store label locations, rather than searching the file each time a label is needed.

6. When adding or deleting questions or replacements from an existing unit, have CAISPT update the student records (because the question numbers shift).

7. Allow a notes option between teacher and students, either by adding another program (and chaining), or by modifying CAISPR and CAISP.

8. Allow the teachers to change a specific student record through the CAISPR program.

9. Standardize the sign on procedure for all programs so that if an error is made, there will always be an option for another chance.

10. Allow course and student password changes in CAISPD and CAISPR.

11. Allow more than one student to enter at the same time by using extra scratch files. Systems differ, but generally, if two or more students are writing in the same data file simultaneously, one will be kicked out. This can occur with CAISPS and the course file.

12. Students entering a unit should be able to jump to the point in the unit at which they left off, if they already used the unit and had to leave in the middle. When they leave they can be given the segment number with which to start next time.

13. A teacher using CAISPT should be able to switch to student mode and back to see how well his unit is working.

14. Have a special character designate a comma when text is input. Before putting the line in the data file, translate the character into a comma. (The problem with commas occurs in the input mode.)

15. Alphabetize students in CAISPR.

16. In CAISPT, when asked "BEFORE WHICH SEGMENT DO YOU WISH TO ADD?", the user should be given the range of choices.

17. In CAISPT, explain in the alter mode that the line numbers shift when adding and deleting, just as segment numbers do.

18. Put in a "Please Wait" message at the end of the student program, since there is a time delay due to file updating.

19. Rather than check for three X's ("XXX") to terminate text input in CAISPT, check for two or more X's.

20. Show the maximum line length for text input in CAISPT.

21. Explain Branch if Taken and Branch if Correct better in CAISPT.

22. Change the order of segment choices in CAISPT. Rather than having LABEL first, put it next to the BRANCH choice.

23. Explain some of the more subtle uses of Replacement Questions and Branching, such as how they can be used to give hints, as in Hewlett Packard's IDF. (Put the hints in the replacement questions and the messages. Follow the string of replacements with a Branch if Correct to the next section, and follow that with an unconditional branch to the original question. The last replacement question could instruct the student to input a certain character, which would be accepted as the correct answer, thus allowing the student to go on.)

24. Have the answer judging allow a range of numerical answers, and have it use a spelling algorithm, if desired, to accept slight misspelling or check only for key letters.

25. Allow a random number generator to be used in questions, with the computer finding the correct answers.

26. In the records program have the computer print, along with the student's unit records, whether he passed the unit or not, or the percentage correct. The teacher should be able to specify the criteria for each unit within the unit.

27. Allow randomness in the order in which questions and their replacements are given.

28. Standardize the programs so that all deletions are verified by the user before the change is processed. In most cases this precaution is already used.

29. Include the availability of an on-line calculator that can be enabled or disabled with a command in the unit.

30. Allow for the deletion of a range of segments in CAISPT, instead of one segment at a time.

31. Besides commas, make provisions for use of double quotes and leading asterisks in text. These can be both input and stored as special characters, and translated during output.

32. Allow for spacing, including blank lines and initial blank spaces within a line. This would also have to be done by input and storage of a special character, with decoding done during output.

33. Reorganize question numbers and records output so that the actual questions are numbered 1, 2, 3... , and the replacements are labeled some other way to distinguish them from the questions.

34. On systems that have TIME functions, allow a maximum time limit for questions to be set, if desired. A data item similar to the three kept already for each question can store whether this limit has been exceeded for each question.

35. Allow in-line editing in the CAISPT alter mode.

Appendix A: Listings

On the following pages you will find listings of the programs CAISPT, CAISP, CAISPR, and CAISPD.

LISTINGS Page 1 CAISPT

CAISPT 21121 26-JUL-76

```
10 REM  COMPUTER ASSISTED INDIVIDUALIZED STUDY PACKAGE
20 REM  TEACHER/UNIT PROGRAM
30 REM  JULY 1976   MARK W. FELEZARSKI   UNIVERSITY OF ILLINOIS
40 DIM S$(50)
50 FILE #1,"CAISPU"
60 QUOTE #1
70 PRINT "COURSE NAME";
80 INPUT N$
90 RESTORE #1
100 IF END #1 THEN 410
110 INPUT #1,M$
120 IF M$<>"*N" THEN 100
130 INPUT #1,M$
140 IF M$<>N$ THEN 100
150 INPUT #1,M$
160 PRINT "PASSWORD";
170 INPUT N$
180 IF N$=M$ THEN 220
190 PRINT "TRY AGAIN, PASSWORD";
200 INPUT N$
210 IF N$=M$ THEN 410
220 PRINT "WHICH UNIT?    CHOICES:"
230 LET A=0
240 IF END#1 THEN 310
250 INPUT #1,M$
260 IF M$="*N" THEN 310
270 LET A=A+1
280 LET S$(A)=M$
290 PRINT M$,
300 GO TO 240
310 INPUT M$
320 FOR I=1 TO A
330 IF M$=S$(I) THEN 360
340 NEXT I
350 GO TO 410
360 FILE #1,M$
370 FILE #2,"CAISFS"
380 QUOTE ALL
390 GOSUB 470
400 GO TO 460
410 PRINT "INVALID ENTRY, SORRY,"
420 PRINT "DO YOU WANT TO TRY AGAIN";
430 INPUT N$
440 IF N$="" THEN 420
450 IF LEFT$(N$,1)="Y" THEN 70
460 CHAIN "ROUTER",100
470 REM - EDIT UNIT -
480 PRINT "CHOICES: (1) ADD SEGMENT(S), (2) ALTER AN EXISTING SEGMENT,"
490 PRINT "   (3) DELETE A SEGMENT, (4) PRINT, (5) EXIT   ";
500 INPUT I
510 IF I<1 THEN 480
520 IF I>5 THEN 480
530 ON I GO TO 540,570,600,630,660
540 REM - ADD A SEGMENT -
550 GOSUB 670
560 GO TO 480
570 REM - ALTER A SEGMENT -
580 GOSUB 1720
590 GO TO 480
600 REM - DELETE A SEGMENT -
610 GOSUB 2380
620 GO TO 480
630 REM - PRINT -
640 GOSUB 2940
650 GO TO 480
660 RETURN
670 REM - ADD A SEGMENT -
680 PRINT "BEFORE WHICH SEGMENT DO YOU WISH TO ADD?"
690 PRINT "   (TYPE '0' TO NOT ADD)  ";
700 INPUT A
710 IF A<1 THEN 1630
720 REM - GO SEARCH -
730 GOSUB 2600
740 IF A=0 THEN 1630
750 PRINT "AT THIS LOCATION, DO YOU WANT TO ADD: (1) LABEL, (2) TEXT,"
760 PRINT "   (3) QUESTION, (4) REPLACEMENT QUESTION, (5) BRANCH,"
770 PRINT "   (6) RIGHT/WRONG ANSWER MESSAGE, (7) CHAIN, OR (8) NOTHING,
```



```
780 INPUT A
790 IF A<1 THEN 750
800 IF A>8 THEN 750
810 ON A GO TO 820,880,930,960,1240,1110,1480,1610
820 REM - LABEL -
830 PRINT #2,"#L";
840 PRINT "TYPE IN LABEL NAME"
850 INPUT N$
860 PRINT #2,N$;
870 GO TO 750
880 REM - TEXT -
890 PRINT #2,"#T";
900 PRINT "TYPE IN TEXT"
910 GOSUB 1640
920 GO TO 750
930 REM - QUESTION -
940 PRINT #2,"#Q";
950 GO TO 970
960 PRINT #2,"#R";
970 PRINT "TYPE IN QUESTION"
980 GOSUB 1640
990 PRINT #2,"#A";
1000 PRINT "TYPE IN THE ANSWERS YOU WILL ACCEPT, ONE PER LINE"
1010 GOSUB 1640
1020 PRINT "DO YOU WANT A RIGHT ANSWER MESSAGE ('YES' OR 'NO')  ";
1030 INPUT N$
1040 IF N$="" THEN 1020
1050 IF LEFT$(N$,1)="Y" THEN 1150
1060 PRINT "DO YOU WANT A WRONG ANSWER MESSAGE ('YES' OR 'NO')  ";
1070 INPUT N$
1080 IF N$="" THEN 1060
1090 IF LEFT$(N$,1)="Y" THEN 1200
1100 GO TO 750
1110 PRINT "(1) RIGHT ANSWER MESSAGE, OR (2) WRONG ANSWER MESSAGE  ";
1120 INPUT Q
1130 IF Q=2 THEN 1200
1140 IF Q<>1 THEN 1110
1150 PRINT #2,"#MR";
1160 PRINT "TYPE IN MESSAGE"
1170 GOSUB 1640
1180 IF A=6 THEN 750
1190 GO TO 1060
1200 PRINT #2,"#MW";
1210 PRINT "TYPE IN MESSAGE"
1220 GOSUB 1640
1230 GO TO 750
1240 REM - CONDITION -
1250 PRINT "(1) BRANCH IF TAKEN, (2) BRANCH IF CORRECT,"
1260 PRINT "(3) BRANCH IF 0 CORRECT, (4) BRANCH, OR (5) NONE"
1270 INPUT A
1280 IF A<1 THEN 1250
1290 IF A>4 THEN 750
1300 ON A GO TO 1310,1330,1380,1430
1310 PRINT #2,"#BT";
1320 GO TO 1340
1330 PRINT #2,"#BC";
1340 PRINT "WHAT IS THE LABEL PRECEDING THE DESIRED QUESTION";
1350 INPUT N$
1360 PRINT #2,N$;
1370 GO TO 1440
1380 PRINT "WHAT IS THE MINIMUM NUMBER CORRECT";
1390 PRINT #2,"#BN";
1400 INPUT A
1410 PRINT #2,A;
1420 GO TO 1440
1430 PRINT #2,"#BL";
1440 PRINT "WHAT IS THE LABEL TO BRANCH TO";
1450 INPUT N$
1460 PRINT #2,N$;
1470 GO TO 750
1480 REM - CHAIN -
1490 PRINT "CHAIN (1) TO BASIC PROGRAM, OR (2) TO ANOTHER UNIT  ";
1500 INPUT Q
1510 IF Q=2 THEN 1570
1520 IF Q<>1 THEN 1490
1530 PRINT "PROGRAM NAME ";
1540 INPUT N$
1550 PRINT #2,"#CP";N$;
1560 GO TO 750
1570 PRINT "UNIT NAME ";
1580 INPUT N$
1590 PRINT #2,"#CU";N$;
1600 GO TO 750
1610 REM - TO UPDATE -
1620 GOSUB 2810
1630 RETURN
```

```
1640 REM - TEXT INPUT -
1650 PRINT "WHEN FINISHED TYPE A LINE 'XXX'"
1660 INPUT M$
1670 IF M$="XXX" THEN 1710
1680 IF M$="" THEN 1660
1690 PRINT #2,M$
1700 GO TO 1660
1710 RETURN
1720 REM - ALTER -
1730 PRINT
1740 PRINT "WHICH SEGMENT DO YOU WANT TO CHANGE ('0' FOR NONE)  "
1750 INPUT A
1760 IF A<1 THEN 2370
1770 GOSUB 2600
1780 IF A=0 THEN 2370
1790 IF M$="*E" THEN 2370
1800 PRINT #2,M$
1810 PRINT
1820 FOR I=1 TO 50
1830 INPUT #1,S$(I)
1840 IF S$(I)="" THEN 1860
1850 IF LEFT$(S$(I)+1)="*" THEN 1880
1860 PRINT I;" ";S$(I)
1870 NEXT I
1880 PRINT
1890 PRINT "(1) ADD LINE, (2) REPLACE LINE, (3) DELETE LINE,"
1900 PRINT "(4) PRINT THE SEGMENT, (5) NONE  "
1910 INPUT Z
1920 PRINT
1930 IF Z<4 THEN 2310
1940 IF Z<1 THEN 1880
1950 ON Z GO TO 1960,2070,2130,2260,2310
1960 PRINT "AFTER WHICH LINE ('0' FOR BEGINNING)  "
1970 INPUT Z
1980 IF Z<I-1 THEN 1880
1990 PRINT "NEW LINE"
2000 INPUT M$
2010 FOR I1=I TO Z+1 BY -1
2020 LET S$(I1+1)=S$(I1)
2030 NEXT I1
2040 LET S$(Z+1)=M$
2050 LET I=I+1
2060 GO TO 1880
2070 PRINT "WHICH LINE"
2080 INPUT Z
2090 IF Z<I-1 THEN 1880
2100 IF Z<1 THEN 1880
2110 PRINT "NEW LINE"
2120 INPUT M$
2130 LET S$(Z)=M$
2140 GO TO 1880
2150 IF LEFT$(M$+2)="*D" THEN 2170
2160 IF I<2 THEN 2190
2170 PRINT "CANNOT DELETE LINE IN THIS SEGMENT."
2180 GO TO 1880
2190 PRINT "WHICH LINE"
2200 INPUT Z
2210 FOR I1=Z TO I-1
2220 LET S$(I1)=S$(I1+1)
2230 NEXT I1
2240 LET I=I-1
2250 GO TO 1880
2260 PRINT
2270 FOR I1=1 TO I-1
2280 PRINT I1;" ";S$(I1)
2290 NEXT I1
2300 GO TO 1880
2310 FOR I1=1 TO I-1
2320 PRINT #2,S$(I1)
2330 NEXT I1
2340 LET M$=S$(1)
2350 GOSUB 2810
2360 PRINT
2370 RETURN
2380 REM - DELETE -
2390 PRINT "WHICH SEGMENT DO YOU WANT DELETED ('0' FOR NONE)  "
2400 INPUT A
2410 IF A<1 THEN 2590
2420 GOSUB 2600
2430 IF A=0 THEN 2590
2440 LET D=0
2450 IF M$="*D" THEN 2470
2460 IF M$="*E" THEN 2480
2470 LET D=1
2480 IF M$="*E" THEN 2580
2490 IF M$="*A" THEN 2590
```



```
2500 INPUT #1,M$
2510 IF LEFT$(M$+1)="*" THEN 2500
2520 IF D=0 THEN 2550
2530 IF M$="*A" THEN 2500
2540 IF LEFT$(M$+2)="*M" THEN 2500
2550 GOSUB 2810
2560 PRINT "DELETED"
2570 GO TO 2590
2580 PRINT "CANNOT DELETE THIS SEGMENT."
2590 RETURN
2600 REM - SEARCH - TAKES A, RETURNS A=0 AND M$ IS FIRST OF A'TH SEG.
2610 SCRATCH #2
2620 RESTORE #1
2630 INPUT #1,M$
2640 LET Q=0
2650 FOR I=1 TO A-1
2660 IF END #1,THEN 2780
2670 PRINT #2,M$;
2680 IF M$="*D" THEN 2700
2690 IF M$<>"*R" THEN 2710
2700 LET Q=Q+1
2710 INPUT #1,M$
2720 IF M$="" THEN 2740
2730 IF LEFT$(M$+1)="*" THEN 2760
2740 PRINT #2,M$;
2750 GO TO 2710
2760 NEXT I
2770 RETURN
2780 PRINT "NUMBER OUT OF BOUNDS"
2790 LET A=0
2800 RETURN
2810 REM - UPDATE -
2820 PRINT #2,M$;
2830 IF END #1,THEN 2860
2840 INPUT #1,M$
2850 GO TO 2820
2860 SCRATCH #1
2870 RESTORE #2
2880 IF END #2,THEN 2920
2890 INPUT #2,M$
2900 PRINT #1,M$;
2910 GO TO 2880
2920 SCRATCH #2
2930 RETURN
2940 REM - PRINT -
2950 PRINT
2960 PRINT
2970 PRINT "(1) ENTIRE UNIT, OR (2) PART OF UNIT  "
2980 INPUT N
2990 IF N=2 THEN 3040
3000 IF N<>1 THEN 2970
3010 LET A=1
3020 LET N=1000
3030 GO TO 3100
3040 PRINT "FROM SEGMENT #"
3050 INPUT A
3060 IF A<1 THEN 3080
3070 LET A=1
3080 PRINT "TO SEGMENT #"
3090 INPUT N
3100 GOSUB 2600
3105 IF A=0 THEN 3760
3110 LET Q=Q+1
3120 LET I=A-1
3130 PRINT
3140 PRINT
3150 LET I=I+1
3160 PRINT
3170 IF I>N THEN 3740
3180 IF M$="*I" THEN 3630
3190 IF M$="*D" THEN 3470
3200 IF M$="*R" THEN 3490
3210 IF M$="*L" THEN 3440
3220 IF M$="*MB" THEN 3590
3230 IF M$="*MW" THEN 3610
3240 IF M$="*CR" THEN 3670
3250 IF M$="*CU" THEN 3700
3255 IF M$="*A" THEN 3560
3260 IF M$="*E" THEN 3730
3270 IF M$<>"*BL" THEN 3300
3280 INPUT #1,L$
3290 GO TO 3310
3300 INPUT #1,M$,L$
3310 PRINT I;" BRANCH TO ";L$;
3320 IF M$<>"*BL" THEN 3350
```

LISTING Page 2 CAISPP (cont.)

```
3330 PRINT
3340 GO TO 3420
3350 IF M$="*BN" THEN 3410
3360 IF M$="*BC" THEN 3390
3370 PRINT " IF QUESTION "#N$#" WAS TAKEN"
3380 GO TO 3420
3390 PRINT " IF QUESTION "#N$#" WAS CORRECT"
3400 GO TO 3420
3410 PRINT " IF AT LEAST "#N$#" CORRECT"
3420 INPUT #1,M$
3430 GO TO 3150
3440 INPUT #1,L$,M$
3450 PRINT I#") LABEL: "#L$
3460 GO TO 3150
3470 PRINT I#") QUESTION              ",
3480 GO TO 3500
3490 PRINT I#") REPLACEMENT QUESTION",
3500 PRINT "    **** QUESTION "#Q#" ****"
3510 PRINT
3520 LET Q=Q+1
3530 GOSUB 3770
3540 PRINT
3550 LET I=I+1
3560 PRINT I#") ACCEPTABLE ANSWERS:"
3570 GOSUB 3770
3580 GO TO 3150
3590 PRINT I#") RIGHT ANSWER MESSAGE:"
3600 GO TO 3640
3610 PRINT I#") WRONG ANSWER MESSAGE:"
3620 GO TO 3640
3630 PRINT I#") TEXT"
3640 PRINT
3650 GOSUB 3770
3660 GO TO 3150
3670 INPUT #1,L$,M$
3680 PRINT I#") CHAIN TO PROGRAM: "#L$
3690 GO TO 3150
3700 INPUT #1,L$,M$
3710 PRINT I#") CHAIN TO UNIT: "#L$
3720 GO TO 3150
3730 PRINT I#") END"
3740 PRINT
3750 PRINT
3760 RETURN
3770 REM - PRINT TO NEXT * -
3780 INPUT #1,M$
3790 IF M$="" THEN 3810
3800 IF LEFT$(M$,1)="*" THEN 3830
3810 PRINT "   "#M$
3820 GO TO 3780
3830 RETURN
3840 END
```

CAISP 21336 26-JUL-76

```
10 REM  COMPUTER ASSISTED INDIVIDUALIZED STUDY PACKAGE
20 REM  STUDENT PROGRAM
30 REM  JULY 1976   MARK W. FELCZANSKI   UNIVERSITY OF ILLINOIS
40 DIM A1(24),B1(24),C1(24)
50 FILE #3,"CAISPS"
60 LET S1=0
70 LET S2=0
80 PRINT "NAME";
90 INPUT X$
100 PRINT "COURSE";
110 INPUT Y$
120 FILE #1,"CAISPU"
130 RESTORE #1
140 QUOTE #1
150 IF END #1,THEN 830
160 INPUT #1,M$
170 IF M$<>"*N" THEN 150
180 INPUT #1,M$
190 IF M$<>Y$ THEN 150
200 FILE #2,Y$
```



```
210 RESTORE #2
220 SCRATCH #3
230 QUOTE ALL
240 INPUT #2,M$
250 PRINT #3,M$;
260 IF M$<>"*N" THEN 240
270 IF END #2, THEN 850
280 INPUT #2,M$,C$
290 PRINT #3,M$;C$;
300 IF M$<>X$ THEN 240
310 IF S1=1 THEN 430
320 PRINT "PASSWORD";
330 INPUT N$
340 IF N$=C$ THEN 380
350 PRINT "TRY AGAIN, PASSWORD";
360 INPUT N$
370 IF N$<>C$ THEN 870
380 PRINT "UNIT";
390 INPUT U$
400 PRINT
410 PRINT "IF YOU WANT TO LEAVE THE UNIT, TYPE 'STOP' WHEN IT"
420 PRINT "SAYS 'PRESS -RETURN-?'"
430 INPUT #1,M$
440 LET S1=0
450 IF END #1,THEN 890
460 INPUT #1,M$
470 IF M$="*N" THEN 890
480 IF M$<>U$ THEN 450
490 FILE #1,U$
500 RESTORE #1
510 QUOTE #1
520 INPUT #2,M$
530 IF M$="*N" THEN 690
540 INPUT #2,A$,B$,C$
550 IF M$=U$ THEN 580
560 PRINT #3,M$;A$;B$;C$;
570 GO TO 520
580 IF A$<>"-1" THEN 610
590 LET A=B=C=0
600 GO TO 640
610 LET A=VAL(A$)
620 LET B=VAL(B$)
630 LET C=VAL(C$)
640 INPUT #2,M$
650 IF M$="*N" THEN 700
660 INPUT #2,N$,B$,C$
670 PRINT #3,M$;N$;B$;C$;
680 GO TO 640
690 LET A=B=C=0
695 LET A$=""
700 GOSUB 980
710 REM *EXECUTE UNIT*
720 PRINT #3,U$;A#;C$"*N";
730 IF END #2,THEN 770
740 INPUT #2,M$
750 PRINT #3,M$;
760 GO TO 730
770 SCRATCH #2
780 RESTORE #3
790 IF END #3, THEN 900
800 INPUT #3,M$
810 PRINT #2,M$;
820 GO TO 790
830 PRINT "COURSE NOT FOUND"
840 GO TO 960
850 PRINT "NAME NOT FOUND IN THIS COURSE"
860 GO TO 960
870 PRINT "WRONG PASSWORD"
880 GO TO 960
890 PRINT "UNIT NOT FOUND IN THIS COURSE"
900 IF S1=0 THEN 930
910 INPUT #1,U$
920 GO TO 120
930 IF S2=0 THEN 960
940 INPUT #1,N$
950 CHAIN N$
960 SCRATCH #3
970 CHAIN "ROUTER",100
```

```
980 REM - EXECUTE UNIT -
990 PRINT
1000 LET S=0
1010 FOR I=1 TO 24
1020 LET T=INT(A/2)
1030 LET A1(I)=A-T*2
1040 LET A=T
1050 LET T=INT(B/2)
1060 LET B1(I)=B-T*2
1070 LET B=T
1080 LET T=INT(C/2)
1090 LET C1(I)=C-T*2
1100 LET C=T
1110 NEXT I
1120 LET Q1=0
1130 LET C0=0
1140 INPUT #1,M$
1150 LET I=1
1160 REM - NEXT SEGMENT -
1170 IF M$="*T" THEN 1270
1180 IF M$="*Q" THEN 1300
1190 IF M$="*R" THEN 1380
1200 IF M$="*L" THEN 1340
1210 IF LEFT$(M$,2)="*C" THEN 1440
1220 IF M$="*E" THEN 1500
1230 IF LEFT$(M$,2)<>"*B" THEN 1490
1240 REM *CONDITION*
1250 GOSUB 2310
1260 GO TO 1160
1270 REM *TEXT*
1280 GOSUB 1600
1290 GO TO 1160
1300 REM *QUESTION*
1310 GOSUB 1700
1320 IF S=1 THEN 1500
1330 GO TO 1160
1340 REM *LABEL*
1350 INPUT #1,N$,M$
1360 LET I=I+1
1370 GO TO 1160
1380 REM *REPLACEMENT*
1390 GOSUB 2250
1400 GOSUB 2250
1410 IF LEFT$(M$,2)="*M" THEN 1400
1420 LET Q1=Q1-1
1430 GO TO 1160
1440 IF M$<>"*CU" THEN 1470
1450 LET S1=1
1460 GO TO 1500
1470 LET S2=1
1480 GO TO 1500
1490 PRINT "UNIT ERROR: UNDEFINED OR MISPLACED SEGMENT: ";I;":";M$;". SE
E INSTRUCTOR."
1500 LET A=B=C=0
1510 IF A$<>"-1" THEN 1540
1520 LET A=-1
1530 RETURN
1540 FOR I=1 TO 24
1550 LET A=A+A1(I)*2**(I-1)
1560 LET B=B+B1(I)*2**(I-1)
1570 LET C=C+C1(I)*2**(I-1)
1580 NEXT I
1590 RETURN
1600 REM - ECHO FILE TO * -
1610 PRINT
1620 INPUT #1,M$
1630 IF M$="" THEN 1650
1640 IF LEFT$(M$,1)="*" THEN 1670
1650 PRINT M$
1660 GO TO 1620
1670 PRINT
1680 LET I=I+1
1690 RETURN
1700 REM - QUESTION -
1710 LET I1=1
1720 LET Q1=Q1+1
1730 IF B1(Q1)=0 THEN 1990
1740 IF A1(Q1)=0 THEN 1800
```



```
1750 GOSUB 2250
1760 LET C0=C0+1
1770 GOSUB 2250
1780 IF LEFT$(M$,2)="*M" THEN 1770
1790 RETURN
1800 GOSUB 2250
1810 GOSUB 2250
1820 IF LEFT$(M$,2)="*M" THEN 1810
1830 IF M$="*L" THEN 1810
1840 IF M$="*R" THEN 1720
1850 REM RETURN TO I1
1860 GOSUB 2850
1870 LET Q1=Q1+1
1880 IF C1(Q1)=1 THEN 1910
1890 LET C1(Q1)=1
1900 GO TO 2040
1910 GOSUB 2250
1920 GOSUB 2250
1930 IF LEFT$(M$,2)="*M" THEN 1920
1940 IF M$="*L" THEN 1920
1950 IF M$="*R" THEN 1870
1960 REM RETURN TO I1
1970 GOSUB 2850
1980 LET Q1=Q1+1
1990 PRINT "PRESS -RETURN-  ";
2000 INPUT N$
2010 IF N$<>"STOP" THEN 2040
2020 LET S=1
2030 RETURN
2040 LET B1(Q1)=1
2050 GOSUB 1600
2060 INPUT M$
2070 INPUT #1,M$
2080 IF LEFT$(M$,1)="*" THEN 2160
2090 IF M$<>M$ THEN 2070
2100 LET A1(Q1)=1
2110 LET C0=C0+1
2120 GOSUB 2250
2130 IF M$="*MR" THEN 2210
2140 IF M$<>"*MW" THEN 2240
2150 GO TO 2120
2160 LET I=I+1
2170 IF M$="*MW" THEN 2210
2180 IF M$<>"*MR" THEN 2240
2190 GOSUB 2250
2200 GO TO 2170
2210 GOSUB 1600
2220 IF LEFT$(M$,2)<>"*M" THEN 2240
2230 GOSUB 2250
2240 RETURN
2250 REM - READ TO NEXT * -
2260 INPUT #1,M$
2270 IF M$="" THEN 2260
2280 IF LEFT$(M$,1)<>"*" THEN 2260
2290 LET I=I+1
2300 RETURN
2310 REM - CONDITIONS -
2320 IF M$<>"*BL" THEN 2350
2330 INPUT #1,L$
2340 GO TO 2650
2350 INPUT #1,N$,L$
2360 IF M$="*BC" THEN 2470
2370 IF M$="*BT" THEN 2410
2380 LET P=VAL(N$)
2390 IF P<=C0 THEN 2650
2400 GO TO 2670
2410 LET I1=I+1
2420 GOSUB 2720
2430 IF M$="*E" THEN 2700
2440 IF B1(Q1+1)=1 THEN 2650
2450 GOSUB 2850
2460 RETURN
2470 LET I1=I+1
2480 GOSUB 2720
2490 IF M$="*E" THEN 2700
2500 LET I2=0
2510 INPUT #1,M$
2520 LET I=I+1
```

```
2530 IF M$<>"@" THEN 2700
2540 LET I2=I2+1
2550 GOSUB 2250
2560 IF M$="@A" THEN 2550
2570 IF LEFT$(M$,2)="@M" THEN 2550
2580 IF M$="@E" THEN 2540
2590 FOR P=01+1 TO 01+I2
2600 IF A1(P)=1 THEN 2650
2610 NEXT P
2620 LET 01=01+I2
2630 GOSUB 2850
2640 RETURN
2650 LET N$=L$
2660 GOSUB 2720
2670 INPUT #1,M$
2680 LET I=I+1
2690 RETURN
2700 PRINT "UNIT ERROR: LABEL "+N$+" MUST IMMEDIATELY PRECEDE QUESTION.
SEE INSTRUCTOR."
2710 RETURN
2720 REM -SEARCH FOR LABEL N$-
2730 RESTORE #1
2740 LET I=0
2750 LET 01=0
2760 GOSUB 2250
2770 IF M$="@L" THEN 2820
2780 IF M$="@E" THEN 2840
2790 IF M$<>"@A" THEN 2760
2800 LET 01=01+1
2810 GO TO 2760
2820 INPUT #1,M$
2830 IF M$<>N$ THEN 2760
2840 RETURN
2850 REM - RETURN TO I1 -
2860 IF I I1 THEN 2900
2870 RESTORE #1
2880 LET I=0
2890 LET 01=0
2900 GOSUB 2250
2910 IF M$<>"@A" THEN 2930
2920 LET 01=01+1
2930 IF I I1 THEN 2900
2940 RETURN
2950 END
```



```
10 REM COMPUTER ASSISTED INDIVIDUALIZED STUDY PACKAGE
20 REM RECORDS PROGRAM
30 REM JULY 1976  MARK W. FELCZARSKI  UNIVERSITY OF ILLINOIS
40 READ L
50 DATA 24
60 DIM C0(24),M0(24),X1(24),M1(24)
70 FILE #3,"CAISPS"
80 FILE #1,"CAISFU"
90 QUOTE ALL
100 PRINT "COURSE";
110 INPUT C$
120 RESTORE #1
130 IF END #1, THEN 1270
140 INPUT #1,M$
150 IF M$<>"@N" THEN 130
160 INPUT #1,M$
170 IF M$<>C$ THEN 130
180 INPUT #1,M$
190 PRINT "PASSWORD";
200 INPUT N$
210 IF N$=M$ THEN 250
220 PRINT "TRY AGAIN, PASSWORD";
230 INPUT N$
240 IF N$<>M$ THEN 1290
250 FILE #1,C$
260 QUOTE #1
270 PRINT
280 PRINT "PRESS  RETURN ";
290 INPUT N$
300 PRINT "CHOICES: (1) PRINT STUDENT RECORD(S),"
310 PRINT "         (2) ADD/DELETE STUDENTS,"
320 PRINT "         (3) SET NO RECORD OPTION,"
330 PRINT "         (4) SEE UNIT RECORD,"
340 PRINT "         (5) DELETE CERTAIN RECORDS,"
350 PRINT "         (6) EXIT,"
360 INPUT I
```



```
370 IF I<6 THEN 300
380 PRINT
390 ON I GO TO 400,550,650,960,990,1300
400 REM - PRINT -
410 PRINT "(1) ALL STUDENTS,(2) ONE STUDENT, OR (3) LIST OF STUDENTS  ";
420 INPUT I
430 RESTORE #1
440 IF I=1 THEN 530
450 IF I=2 THEN 490
460 IF I<>3 THEN 410
470 GOSUB 1320
480 GO TO 270
490 GOSUB 1420
500 IF I=0 THEN 270
510 GOSUB 1690
520 GO TO 270
530 GOSUB 1620
540 GO TO 270
550 REM - ADD/DELETE STUDENTS -
560 RESTORE #1
570 PRINT "(1) ADD, OR (2) DELETE  ";
580 INPUT I
590 IF I=1 THEN 630
600 IF I<>2 THEN 570
610 GOSUB 1990
620 GO TO 270
630 GOSUB 2050
640 GO TO 270
650 REM - SET NO RECORD OPTION -
660 PRINT "THE NO RECORD OPTION ALLOWS THE STUDENT FOR WHICH IT IS"
670 PRINT "SET TO GO THROUGH THE UNIT SPECIFIED WITHOUT RECORDS BEING"
680 PRINT "KEPT."
690 PRINT "WHAT IS THE NAME OF THE UNIT";
700 INPUT I$
710 PRINT "(1) ALL STUDENTS FOR THIS UNIT, OR (2) SELECTED STUDENTS FOR"
720 PRINT "THIS UNIT  ";
730 INPUT I
740 IF I=1 THEN 860
750 IF I<>2 THEN 710
760 GOSUB 1420
770 IF I=0 THEN 800
780 GOSUB 2680
790 GOSUB 2230
800 PRINT "ANOTHER STUDENT ('YES' OR 'NO')  ";
810 INPUT A$
820 IF A$="" THEN 800
830 IF LEFT$(A$,1)="Y" THEN 760
840 IF LEFT$(A$,1)<>"N" THEN 800
850 GO TO 270
860 RESTORE #1
870 SCRATCH #3
880 INPUT #1,N$
890 PRINT #3,N$;
900 IF END #1,THEN 940
910 INPUT #1,N$,M$
920 GOSUB 2680
930 GO TO 900
940 GOSUB 2230
950 GO TO 270
960 REM - SEE UNIT RECORD -
970 GOSUB 2780
980 GO TO 270
990 REM - DELETE CERTAIN RECORDS -
1000 PRINT "DELETE A PARTICULAR UNIT FOR (1) SELECTED STUDENTS,"
1010 PRINT "(2) ALL STUDENTS, OR (3) NOT DELETE  ";
1020 INPUT I
1030 PRINT "WHICH UNIT";
1040 INPUT I$
1050 IF I=1 THEN 1170
1060 IF I<>2 THEN 270
1070 RESTORE #1
1080 SCRATCH #3
1090 INPUT #1,N$
1100 PRINT #3,N$;
1110 IF END #1,THEN 1150
1120 INPUT #1,N$,M$
1130 GOSUB 2360
1140 GO TO 1110
```

```
1150 GOSUB 2230
1160 GO TO 270
1170 GOSUB 1420
1180 IF I=0 THEN 1210
1190 GOSUB 2360
1200 GOSUB 2230
1210 PRINT "ANOTHER STUDENT ('YES' OR 'NO') ";
1220 INPUT A$
1230 IF A$="" THEN 1210
1240 IF LEFT$(A$,1)="Y" THEN 1170
1250 IF LEFT$(A$,1)<>"N" THEN 1210
1260 GO TO 270
1270 PRINT "COURSE NOT FOUND"
1280 GO TO 1310
1290 PRINT "WRONG PASSWORD"
1300 SCRATCH #3
1310 CHAIN "ROUTER",100
1320 REM - LIST STUDENTS -
1330 PRINT
1340 INPUT #1,N$
1350 IF END #1,THEN 1410
1360 INPUT #1,N$
1370 PRINT N$
1380 INPUT #1,N$
1390 IF N$<>"*N" THEN 1380
1400 GO TO 1350
1410 RETURN
1420 REM - FIND A STUDENT -
1430 SCRATCH #3
1440 RESTORE #1
1450 PRINT "STUDENT'S NAME";
1460 INPUT A$
1470 INPUT #1,N$
1480 PRINT #3,N$;
1490 IF END #1,THEN 1590
1500 INPUT #1,N$,M$
1510 IF N$=A$ THEN 1570
1520 PRINT #3,N$;M$;
1530 INPUT #1,N$
1540 PRINT #3,N$;
1550 IF N$<>"*N" THEN 1530
1560 GO TO 1490
1570 LET I=1
1580 RETURN
1590 PRINT "STUDENT NOT FOUND"
1600 LET I=0
1610 RETURN
1620 REM - PRINT ALL STUDENTS -
1630 INPUT #1,N$
1640 IF END #1,THEN 1680
1650 INPUT #1,N$,M$
1660 GOSUB 1690
1670 GO TO 1640
1680 RETURN
1690 REM - PRINT STUDENT N$ -
1700 PRINT
1710 PRINT N$
1720 PRINT
1730 PRINT "UNIT  ";
1740 FOR I=1 TO L
1750 LET I$=" "+STR$(I)
1760 PRINT I$;
1770 NEXT I
1780 PRINT
1790 INPUT #1,N$
1800 IF N$="*N" THEN 1980
1810 INPUT #1,A$,B$,C$
1820 LET N$=LEFT$(N$+"          ",6)
1830 PRINT N$;
1840 IF A$<>" 1" THEN 1870
1850 PRINT "  NO RECORDS UNIT"
1860 GO TO 1790
1870 LET A=VAL(A$)
1880 LET B=VAL(B$)
1890 LET C=VAL(C$)
1900 FOR I=1 TO L
1910 GOSUB 2460
1920 IF I<10 THEN 1940
1930 LET N$=" "+N$
1940 PRINT N$;
1950 NEXT I
1960 PRINT
1970 GO TO 1790
1980 RETURN
1990 REM - DELETE A STUDENT -
2000 GOSUB 1420
2010 INPUT #1,N$
2020 IF N$<>"*N" THEN 2010
2030 GOSUB 2230
2040 RETURN
2050 REM - ADD A STUDENT -
2060 SCRATCH #3
2070 IF END #1,THEN 2110
2080 INPUT #1,N$
2090 PRINT #3,N$
2100 GO TO 2070
2110 PRINT "STUDENT'S NAME";
2120 INPUT A$
2130 PRINT "STUDENT'S PASSWORD";
2140 INPUT B$
2150 PRINT #3,A$;B$;"*N";
2160 PRINT"ANOTHER STUDENT ('YES' OR 'NO') ";
2170 INPUT N$
2180 IF N$="" THEN 2160
2190 IF LEFT$(N$,1)="Y" THEN 2110
2200 IF LEFT$(N$,1)<>"N" THEN 2160
2210 GOSUB 2230
2220 RETURN
2230 REM -UPDATE -
2240 IF END #1,THEN 2280
2250 INPUT #1,N$
2260 PRINT #3,N$;
2270 GO TO 2240
2280 SCRATCH #1
2290 RESTORE #3
2300 IF END #3,THEN 2340
2310 INPUT #3,N$
2320 PRINT #1,N$;
2330 GO TO 2300
2340 SCRATCH #3
2350 RETURN
2360 REM - DELETE UNIT I$ FROM FOUND STUDENT -
2370 PRINT #3,N$;M$;
2380 INPUT #1,N$
2390 IF N$="*N" THEN 2440
2400 INPUT #1,A$,B$,C$
2410 IF N$=I$ THEN 2380
2420 PRINT #3,N$;A$;B$;C$;
2430 GO TO 2380
2440 PRINT #3,N$;
2450 RETURN
2460 REM - DECOMPOSE A,B,C -
2470 LET T=INT(A/2)
2480 LET A1=A-T*2
2490 LET A=T
2500 LET T=INT(B/2)
2510 LET B1=B-T*2
2520 LET B=T
2530 LET T=INT(C/2)
2540 LET C1=C-T*2
2550 LET C=T
2560 IF B1=1 THEN 2590
2570 LET N$="  "
2580 RETURN
2590 IF A1=1 THEN 2620
2600 LET N$="X"
2610 GO TO 2630
2620 LET N$="C"
2630 IF C1=1 THEN 2660
2640 LET N$=" "+N$
2650 RETURN
2660 LET N$="*"+N$
2670 RETURN
2680 REM - SET NO RECORD UNIT I$ TO STUDENT N$ -
2690 PRINT #3,N$;M$;
2700 INPUT #1,N$
```

```
2710 IF N$="*N" THEN 2760
2720 INPUT #1,A$,B$,C$
2730 IF N$=I$ THEN 2700
2740 PRINT #3,N$;A$;B$;C$;
2750 GO TO 2700
2760 PRINT #3,I$;-1;0;0;"*N";
2770 RETURN
2780 REM - SEE UNIT RECORD -
2790 PRINT "WHICH UNIT";
2800 INPUT M$
2810 PRINT "WAIT.  - - COMPUTING - -"
2820 FOR I=1 TO L
2830 LET C0(I)=M0(I)=X1(I)=M1(I)=0
2840 NEXT I
2850 LET S=0
2860 LET R=0
2870 RESTORE #1
2880 INPUT #1,N$
2890 IF END #1,THEN 3170
2900 INPUT #1,N$,C$
2910 INPUT #1,N$
2920 IF N$="*N" THEN 2890
2930 INPUT #1,A$,B$,C$
2940 IF N$<>M$ THEN 2910
2950 LET S=S+1
2960 IF A$<>"-1" THEN 2990
2970 LET R=R+1
2980 GO TO 2910
2990 LET A=VAL(A$)
3000 LET B=VAL(B$)
3010 LET C=VAL(C$)
3020 FOR I=1 TO L
3030 GOSUB 2460
3040 IF N$="  " THEN 3150
3050 IF N$=" C" THEN 3100
3060 IF N$=" X" THEN 3120
3070 IF N$="*C" THEN 3140
3080 LET M1(I)=M1(I)+1
3090 GO TO 3150
3100 LET C0(I)=C0(I)+1
3110 GO TO 3150
3120 LET X1(I)=X1(I)+1
3130 GO TO 3150
3140 LET M0(I)=M0(I)+1
3150 NEXT I
3160 GO TO 2910
3170 PRINT
3180 PRINT "UNIT:  ";M$
3190 PRINT
3200 PRINT "STUDENTS ENTERED: ";S
3210 PRINT "NON RECORD STUDENTS: ";R
3220 PRINT
3230 PRINT "QUESTION";TAB(11);"C";TAB(14);"*C";TAB(19);"X";TAB(22);"*X";
3231 PRINT TAB(35);"QUESTION";TAB(46);"C";TAB(49);"*C";TAB(54);"X";TAB(5
7);"*X"
3240 FOR I=1 TO L/2
3250 PRINT TAB(5);I;TAB(10);C0(I);TAB(14);M0(I);TAB(18);X1(I);TAB(22);M1
(I);
3251 PRINT TAB(40);I+L/2;TAB(45);C0(I+L/2);TAB(49);M0(I+L/2);TAB(53);X1(
I+L/2);TAB(57);M1(I+L/2)
3260 NEXT I
3270 PRINT
3280 RETURN
3290 END
```

```
CAISPD          23:01          26-JUL-76


10 REM  COMPUTER ASSISTED INDIVIDUALIZED STUDY PROGRAM
20 REM  DIRECTOR'S PROGRAM
30 REM  JULY 1976   MARK W. PELCZARSKI   UNIVERSITY OF ILLINOIS
40 PRINT "CAISP DIRECTOR'S PROGRAM"
50 PRINT "PASSWORD";
60 INPUT A$
70 IF A$<>"" THEN 1040
80 FILE #1,"CAISPU"
90 FILE #3,"CAISPS"
100 QUOTE ALL
110 PRINT "WHEN CREATING A NEW COURSE NAME OR A NEW UNIT NAME, BE POSITI
VE"
120 PRINT "THAT NO OTHER FILES BY THAT NAME EXIST.  IF YOU NEGLECT THIS"
130 PRINT "PRECAUTION, THE ORIGINAL FILE WILL BE DESTROYED!!!"
140 PRINT
150 PRINT "(1) NEW COURSE, (2) CREATE A UNIT NAME FOR A COURSE,"
160 PRINT "(3) ADD EXISTING UNIT TO A COURSE, (4) DELETE UNIT FROM"
170 PRINT "A COURSE, (5) LIST THE COURSES, (6) SEE A COURSE,"
180 PRINT "(7) DELETE A COURSE, (8) EXIT  ";
190 INPUT I
200 RESTORE #1
210 PRINT
220 SCRATCH #3
230 ON I GO TO 240,350,350,530,740,800,910,1040
240 PRINT "COURSE NAME";
250 INPUT A$
260 FILE #2,A$
270 SCRATCH #2
280 PRINT #2,"*N";
290 PRINT "COURSE PASSWORD";
300 INPUT B$
310 PRINT #3,"*N";A$;B$;
320 GOSUB 1050
330 PRINT "TO INITIALIZE STUDENTS, USE THE RECORDS PROGRAM."
340 GO TO 140
350 PRINT "WHICH COURSE";
360 INPUT A$
370 GOSUB 1160
380 IF S=0 THEN 140
390 PRINT #3,A$;N$;
400 PRINT "UNIT NAME";
410 INPUT B$
420 PRINT #3,B$;
430 IF I=3 THEN 470
440 FILE #2,B$
450 SCRATCH #2
460 PRINT #2,"*E"
470 PRINT "ANOTHER FOR THIS COURSE";
480 INPUT A$
490 IF A$="" THEN 470
500 IF LEFT$(A$,1)="Y" THEN 400
510 GOSUB 1050
520 GO TO 140
530 PRINT "WHICH COURSE";
540 INPUT A$
550 GOSUB 1160
560 PRINT #3,A$;N$;
570 PRINT "UNIT NAME";
580 INPUT B$
590 IF END #1,THEN 660
600 INPUT #1,N$
610 IF N$="*N" THEN 650
620 IF N$=B$ THEN 590
630 PRINT #3,N$;
640 GO TO 590
```



```
650 PRINT #3,N$;
660 GOSUB 1050
670 PRINT "ANOTHER FOR THIS COURSE";
680 INPUT B$
690 IF B$="" THEN 670
700 IF LEFT$(B$,1)<>"Y" THEN 140
710 SCRATCH #3
720 RESTORE #1
730 GO TO 550
740 IF END #1, THEN 140
750 INPUT #1,N$
760 IF N$<>"*N" THEN 740
770 INPUT #1,N$
780 PRINT N$
790 GO TO 750
800 PRINT "WHICH COURSE";
810 INPUT A$
820 GOSUB 1160
830 IF S=0 THEN 140
840 PRINT "COURSE: ";A$;"    PASSWORD: ";N$
850 PRINT "UNITS:"
860 IF END #1,THEN 140
870 INPUT #1,N$
880 IF N$="*N" THEN 140
890 PRINT N$,
900 GO TO 860
910 PRINT "WHICH COURSE";
920 INPUT A$
930 PRINT "DELETE ";A$;
940 INPUT N$
950 IF N$="" THEN 930
960 IF LEFT$(N$,1)<>"Y" THEN 140
970 GOSUB 1160
980 IF S=0 THEN 140
990 IF END #1,THEN 1020
1000 INPUT #1,N$
1010 IF N$<>"*N" THEN 990
1020 GOSUB 1050
1030 GO TO 140
1040 CHAIN "ROUTER",100
1050 IF END #1,THEN 1090
1060 INPUT #1,N$
1070 PRINT #3,N$;
1080 GO TO 1050
1090 SCRATCH #1
1100 RESTORE #3
1110 IF END #3,THEN 1150
1120 INPUT #3,N$
1130 PRINT #1,N$;
1140 GO TO 1110
1150 RETURN
1160 IF END #1,THEN 1260
1170 INPUT #1,N$
1180 PRINT #3,N$;
1190 IF N$<>"*N" THEN 1160
1200 INPUT #1,B$,N$
1210 IF B$=A$ THEN 1240
1220 PRINT #3,B$;N$;
1230 GO TO 1160
1240 LET S=1
1250 RETURN
1260 LET S=0
1270 PRINT "COURSE NOT FOUND"
1280 RETURN
1290 END
```

Appendix B. Variable Definitions

Following are the definitions of all variables used in the CAISP programs:

A - CAISPR, CAISP: first number of unit record
  - CAISPT: number of available unit; segment number; choice number

A1 - CAISPR: whether question was answered correctly
A1(24) - CAISP: whether answered correctly for each of 24 questions

A$ - CAISPR, CAISP: first number of unit record (string), general
     CAISPD: general character variable

B - CAISPR, CAISP: second number of unit record

B1 - CAISPR: whether question has been taken
B1(24) - CAISP: whether taken for each of 24 questions

B$ - CAISPR, CAISP: second number of unit record (string)
   - CAISPD: general character variable

C - CAISPR, CAISP: third number of unit record

C0 - CAISP: number of questions answered correctly
C0(24) - CAISPR: number of students getting each question correct (first try)

C1 - CAISPR: whether question taken more than once
C1(24) - CAISP: whether each of 24 questions has been taken more than once

C$ - CAISPR: course; third number of unit record (string)
     CAISP: password; third number of unit record (string)

I - Loop index; numerical choice; CAISP: also current segment number

I1 - CAISPT: loop index
   - CAISP: holds current segment number while searching

I2 - CAISP: counts replacement questions for branch on number correct

I$ - CAISPR: unit name

L - CAISPR: maximum number of questions

L$ - CAISPT, CAISP: label, program, or unit name

M0(24) - CAISPR: number of students getting each question correct
                 (more than one try)

M1(24) - CAISPR: number of students missing each question more than once

M$ - CAISPR, CAISPT, CAISP: general character variable
- CAISP: also next instruction

N - CAISPT: choice number

N$ - general character variable

P - CAISP: value of number in branch segment; loop index

Q - CAISPT: choice number; switch (1 when deleting question); number of questions

Q1 - CAISP: question number

R - CAISPR: number of no record students

S - CAISPR: number of students that have entered unit
- CAISP: switch, set if student types "STOP"
- CAISPD: switch, set if course not found

S1 - CAISP: switch, set to 1 if unit is chained to another unit

S2 - CAISP: switch, set to 1 if chain to other program

S$(50) - CAISPT: storage for unit names and for single segment editing

T - CAISPR, CAISP: temporary hold variable

U$ - CAISP: unit

Z1(24) - CAISPR: number of students missing each question once only

Z$ - CAISP: student's name

Y$ - CAISP: course

Z - CAISPT: choice number

SE-948